APPENDIX A

Title 3—The President

EXECUTIVE ORDER 11652

Classification and Declassification of National Security Information and Material

The interests of the United States and its citizens are best served by making information regarding the affairs of Government readily available to the public. This concept of an informed citizenry is reflected in the Freedom of Information Act and in the current public information policies of the executive branch.

Within the Federal Government there is some official information and material which, because it bears directly on the effectiveness of our national defense and the conduct of our foreign relations, must be subject to some constraints for the security of our Nation and the safety of our people and our allies. To protect against actions hostile to the United States, of both an overt and covert nature, it is essential that such official information and material be given only limited dissemination.

This official information or material, referred to as classified information or material in this order, is expressly exempted from public disclosure by Section 552(b)(1) of Title 5, United States Code. Wrongful disclosure of such information or material is recognized in the Federal Criminal Code as providing a basis for prosecution.

To ensure that such information and material is protected, but only to the extent and for such period as is necessary, this order identifies the information to be protected, prescribes classification, downgrading, declassification and safeguarding procedures to be followed, and establishes a monitoring system to ensure its effectiveness.

NOW, THEREFORE, by virtue of the authority vested in me by the Constitution and statutes of the United States, it is hereby ordered:

SECTION 1. *Security Classification Categories.* Official information or material which requires protection against unauthorized disclosure in the interest of the national defense or foreign relations of the United States (hereinafter collectively termed "national security") shall be classified in one of three categories, namely "Top Secret," "Secret," or "Confidential," depending upon the degree of its significance to national security. No other categories shall be used to identify official information or material as requiring protection in the interest of national security, except as otherwise expressly provided by statute. These classification categories are defined as follows:

(A) *"Top Secret."* "Top Secret" refers to that national security information or material which requires the highest degree of protection. The test for assigning "Top Secret" classification shall be whether its unauthorized disclosure could reasonably be expected to cause exceptionally grave damage to the national security. Examples of "exceptionally grave damage" include armed hostilities against the United States or its allies; disruption of foreign relations vitally affecting the national security; the compromise of vital national defense plans or complex cryptologic and communications intelligence systems; the revelation of sensitive intelligence operations; and the disclosure of scientific or technological developments vital to national security. This classification shall be used with the utmost restraint.

(B) *"Secret."* "Secret" refers to that national security information or material which requires a substantial degree of protection. The test for assigning "Secret" classification shall be whether its unuathorized disclosure could reasonably be expected to cause serious damage to the national security. Examples of "serious damage" include

disruption of foreign relations significantly affecting the national security; significant impairment of a program or policy directly related to the national security; revelation of significant military plans or intelligence operations; and compromise of significant scientific or technological developments relating to national security. The classification "Secret" shall be sparingly used.

(C) *"Confidential."* "Confidential" refers to that national security information or material which requires protection. The test for assigning "Confidential" classification shall be whether its unauthorized disclosure could reasonably be expected to cause damage to the national security.

SEC. 2. *Authority to Classify.* The authority to originally classify information or material under this order shall be restricted solely to those offices within the executive branch which are concerned with matters of national security, and shall be limited to the minimum number absolutely required for efficient administration. Except as the context may otherwise indicate, the term "Department" as used in this order shall include agency or other governmental unit.

(A) The authority to orginally classify information or material under this order as "Top Secret" shall be exercised only by such officials as the President may designate in writing and by:

(1) The heads of the Departments listed below;

(2) Such of their senior principal deputies and assistants as the heads of such Departments may designate in writing; and

(3) Such heads and senior principal deputies and assistants of major elements of such Departments, as the heads of such Departments may designate in writing.

Such offices in the Executive Office of the President as the President may designate in writing
Central Intelligence Agency

the Department in possession after consulting with any other Departments having an interest in the subject matter.

(E) Classified information or material transferred to the General Services Administration for accession into the Archives of the United States shall be downgraded and declassified by the Archivist of the United States in accordance with this order, directives of the President issued through the National Security Council and pertinent regulations of the Departments.

(F) Classified information or material with special markings, as described in Section 8, shall be downgraded and declassified as required by law and governing regulations.

SEC. 4. *Classification.* Each person possessing classifying authority shall be held accountable for the propriety of the classifications attributed to him. Both unnecessary classification and over-classification shall be avoided. Classification shall be solely on the basis of national security considerations. In no case shall information be classified in order to conceal inefficiency or administrative error, to prevent embarrassment to a person or Department, to restrain competition or independent initiative, or to prevent for any other reason the release of information which does not require protection in the interest of national security. The following rules shall apply to classification of information under this order:

(A) *Documents in General.* Each classified document shall show on its face its classification and whether it is subject to or exempt from the General Declassification Schedule. It shall also show the office of origin, the date of preparation and classification and, to the extent practicable, be so marked as to indicate which portions are classified, at what level, and which portions are not classified in order to facilitate excerpting and other use. Material containing

references to classified materials, which references do not reveal classified information, shall not be classified.

(B) *Identification of Classifying Authority.* Unless the Department involved shall have provided some other method of identifying the individual at the highest level that authorized classification in each case, material classified under this order shall indicate on its face the identity of the highest authority authorizing the classification. Where the individual who signs or otherwise authenticates a document or item has also authorized the classification, no further annotation as to his identity is required.

(C) *Information or Material Furnished by a Foreign Government or International Organization.* Classified information or material furnished to the United States by a foreign government or international organization shall either retain its original classification or be assigned a United States classification. In either case, the classification shall assure a degree of protection equivalent to that required by the government or international organization which furnished the information or material.

(D) *Classification Responsibilities.* A holder of classified information or material shall observe and respect the classification assigned by the originator. If a holder believes that there is unnecessary classification, that the assigned classification is improper, or that the document is subject to declassification under this order, he shall so inform the originator who shall thereupon re-examine the classification.

SEC. 5. *Declassification and Downgrading.* Classified information and material, unless declassified earlier by the original classifying authority, shall be declassified and downgraded in accordance with the following rules:

(A) *General Declassification Schedule.* (1) "Top Secret." Information or material originally classified "Top Secret" shall become automatically downgraded to "Secret" at the

end of the second full calendar year following the year in which it was originated, downgraded to "Confidential" at the end of the fourth full calendar year following the year in which it was originated, and declassified at the end of the tenth full calendar year following the year in which it was originated.

(2) *"Secret."* Information and material originally classified "Secret" shall become automatically downgraded to "Confidential" at the end of the second full calendar year following the year in which it was originated, and declassified at the end of the eighth full calendar year following the year in which it was originated.

(3) *"Confidential."* Information and material originally classified "Confidential" shall become automatically declassified at the end of the sixth full calendar year following the year in which it was originated.

(B) *Exemptions from General Declassification Schedule.* Certain classified information or material may warrant some degree of protection for a period exceeding that provided in the General Declassification Schedule. An official authorized to originally classify information or material "Top Secret" may exempt from the General Declassification Schedule any level of classified information or material originated by him or under his supervision if it falls within one of the categories described below. In each case such official shall specify in writing on the material the exemption category being claimed and, unless impossible, a date or event for automatic declassification. The use of the exemption authority shall be kept to the absolute minimum consistent with national security requirements and shall be restricted to the following categories:

(1) Classified information or material furnished by foreign governments or international organizations and held by the United States on the understanding that it be kept in confidence.

(2) Classified information or material specifically covered by statute, or pertaining to cryptography, or disclosing intelligence sources or methods.

(3) Classified information or material disclosing a system, plan, installation, project or specific foreign relations matter the continuing protection of which is essential to the national security.

(4) Classified information or material the disclosure of which would place a person in immediate jeopardy.

(C) *Mandatory Review of Exempted Material.* All classified information and material originated after the effective date of this order which is exempted under (B) above from the General Declassification Schedule shall be subject to a classification review by the originating Department at any time after the expiration of ten years from the date of origin provided:

(1) A Department or member of the public requests a review;

(2) The request describes the record with sufficient particularity to enable the Department to identify it; and

(3) The record can be obtained with only a reasonable amount of effort.

Information or material which no longer qualifies for exemption under (B) above shall be declassified. Information or material continuing to qualify under (B) shall be so marked and, unless impossible, a date for automatic declassification shall be set.

(D) *Applicability of the General Declassification Schedule to Previously Classified Material.* Information or material classified before the effective date of this order and which is assigned to Group 4 under Executive Order No. 10501, as amended by Executive Order No. 10964, shall be subject to the General Declassification Schedule. All other

information or material classified before the effective date of this order, whether or not assigned to Groups 1, 2, or 3 of Executive Order No. 10501, as amended, shall be excluded from the General Declassification Schedule. However, at any time after the expiration of ten years from the date of origin it shall be subject to a mandatory classification review and disposition under the same conditions and criteria that apply to classified information and material created after the effective date of this order as set forth in (B) and (C) above.

(E) *Declassification of Classified Information or Material After Thirty Years.* All classified information or material which is thirty years old or more, whether originating before or after the effective date of this order, shall be declassified under the following conditions:

(1) All information and material classified after the effective date of this order shall, whether or not declassification has been requested, become automatically declassified at the end of thirty full calendar years after the date of its original classification except for such specifically identified information or material which the head of the originating Department personally determines in writing at that time to require continued protection because such continued protection is essential to the national security or disclosure would place a person in immediate jeopardy. In such case, the head of the Department shall also specify the period of continued classification.

(2) All information and material classified before the effective date of this order and more than thirty years old shall be systematically reviewed for declassification by the Archivist of the United States by the end of the thirtieth full calendar year following the year in which it was originated. In his review, the Archivist will separate and keep protected only such information or material as is specifically identified by the head of the Department in accordance with (E)(1) above. In such case, the head of the De-

partment shall also specify the period of continued classification.

(F) *Departments Which Do Not Have Authority For Original Classification.* The provisions of this section relating to the declassification of national security information or material shall apply to Departments which, under the terms of this order, do not have current authority to originally classify information or material, but which formerly had such authority under previous Executive orders.

SEC. 6. *Policy Directives on Access, Marking, Safekeeping, Accountability, Transmission, Disposition and Destruction of Classified Information and Material.* The President acting through the National Security Council shall issue directives which shall be binding on all Departments to protect classified information from loss or compromise. Such directives shall conform to the following policies:

(A) No person shall be given access to classified information or material unless such person has been determined to be trustworthy and unless access to such information is necessary for the performance of his duties.

(B) All classified information and material shall be appropriately and conspicuously marked to put all persons on clear notice of its classified contents.

(C) Classified information and material shall be used, possessed, and stored only under conditions which will prevent access by unauthorized persons or dissemination to unauthorized persons.

(D) All classified information and material disseminated outside the executive branch under Executive Order No. 10865 or otherwise shall be properly protected.

(E) Appropriate accountability records for classified information shall be established and maintained and such information and material shall be protected adequately during all transmissions.

(F) Classified information and material no longer needed in current working files or for reference or record purposes shall be destroyed or disposed of in accordance with the records disposal provisions contained in Chapter 33 of Title 44 of the United States Code and other applicable statutes.

(G) Classified information or material shall be reviewed on a systematic basis for the purpose of accomplishing downgrading, declassification, transfer, retirement and destruction at the earliest practicable date.

SEC. 7. *Implementation and Review Responsibilities.* (A) The National Security Council shall monitor the implementation of this order. To assist the National Security Council, an Interagency Classification Review Committee shall be established, composed of representatives of the Departments of State, Defense, and Justice, the Atomic Energy Commission, the Central Intelligence Agency and the National Security Council Staff and a Chairman designated by the President. Representatives of other Departments in the executive branch may be invited to meet with the Committee on matters of particular interest to those Departments. This Committee shall meet regularly and on a continuing basis shall review and take action to ensure compliance with this order, and in particular:

(1) The Committee shall oversee Department actions to ensure compliance with the provisions of this order and implementing directives issued by the President through the National Security Council.

(2) The Committee shall, subject to procedures to be established by it, receive, consider and take action on suggestions and complaints from persons within or without the government with respect to the administration of this order, and in consultation with the affected Department or Departments assure that appropriate action is taken on such suggestions and complaints.

(3) Upon request of the Committee Chairman, any Department shall furnish to the Committee any particular information or material needed by the Committee in carrying out its functions.

(B) To promote the basic purposes of this order, the head of each Department originating or handling classified information or material shall:

(1) Prior to the effective date of this order submit to the Interagency Classification Review Committee for approval a copy of the regulations it proposes to adopt pursuant to this order.

(2) Designate a senior member of his staff who shall ensure effective compliance with and implementation of this order and shall also chair a Departmental committee which shall have authority to act on all suggestions and complaints with respect to the Department's administraion of this order.

(3) Undertake an initial program to familiarize the employees of his Department with the provisions of this order. He shall also establish and maintain active training and orientation programs for employees concerned with classified information or material. Such programs shall include, as a minimum, the briefing of new employees and periodic reorientation during employment to impress upon each individual his responsibility for exercising vigilance and care in complying with the provisions of this order. Additionally, upon termination of employment or contemplated temporary separation for a sixty-day period or more, employees shall be debriefed and each reminded of the provisions of the Criminal Code and other applicable provisions of law relating to penalties for unauthorized disclosure.

(C) The Attorney General, upon request of the head of a Department, his duly designated representative, or the Chairman of the above described Committee, shall personally or through authorized representatives of the Depart-

ment of Justice render an interpretation of this order with respect to any question arising in the course of its administration.

SEC. 8. *Material Covered by the Atomic Energy Act.* Nothing in this order shall supersede any requirements made by or under the Atomic Energy Act of August 30, 1954, as amended. "Restricted Data," and material designated as "Formerly Restricted Data," shall be handled, protected, classified, downgraded and declassified in conformity with the provisions of the Atomic Energy Act of 1954, as amended, and the regulations of the Atomic Energy Commission.

SEC. 9. *Special Departmental Arrangements.* The originating Department or other appropriate authority may impose, in conformity with the provisions of this order, special requirements with respect to access, distribution and protection of classified information and material, including those which presently relate to communications intelligence, intelligence sources and methods and cryptography.

SEC. 10. *Exceptional Cases.* In an exceptional case when a person or Department not authorized to classify information originates information which is believed to require classification, such person or Department shall protect that information in the manner prescribed by this order. Such persons or Department shall transmit the information forthwith, under appropriate safeguards, to the Department having primary interest in the subject matter with a request that a determinaion be made as to classification.

SEC. 11. *Declassification of Presidential Papers.* The Archivist of the United States shall have authority to review and declassify information and material which has been classified by a President, his White House Staff or special committee or commission appointed by him and which the Archivist has in his custody at any archival depository, including a Presidential Library. Such declassifi-

cation shall only be undertaken in accord with: (i) the terms of the donor's deed of gift, (ii) consultations with the Departments having a primary subject-matter interest, and (iii) the provisions of Section 5.

SEC. 12. *Historical Research and Access by Former Government Officials.* The requirement in Section 6(A) that access to classified information or material be granted only as is necessary for the performance of one's duties shall not apply to persons outside the executive branch who are engaged in historical research projects or who have previously occupied policy-making positions to which they were appointed by the President; *Provided,* however, that in each case the heading of the originating Department shall:

(i) determine that access is clearly consistent with the interests of national security; and

(ii) take appropriate steps to assure that classified information or material is not published or otherwise compromised.

Access granted a person by reason of his having previously occupied a policy-making position shall be limited to those papers which the former official originated, reviewed, signed or received while in public office.

SEC. 13. *Administrative and Judicial Action.* (A) Any officer or employee of the United States who unnecessarily classifies or overclassifies information or material shall be notified that his actions are in violation of the terms of this order or of a directive of the President issued through the National Security Council. Repeated abuse of the classification process shall be grounds for an administrative reprimand. In any case where the Departmental committee or the Interagency Classification Review Committee finds that unnecessary classification or overclassification has occurred, it shall make a report to the head of the Department concerned in order that corrective steps may be taken.

(B) The head of each Department is directed to take prompt and stringent administrative action against any officer or employee of the United States, at any level of employment, determined to have been responsible for any release or disclosure of national security information or material in a manner not authorized by or under this order or a directive of the President issued through the National Security Council. Where a violation of criminal statutes may be involved, Departments will refer any such case promptly to the Department of Justice.

SEC. 14. *Revocation of Executive Order No. 10501.* Executive Order No. 10501 of November 5, 1953, as amended by Executive Orders No. 10816 of May 8, 1959, No. 10901 of January 11, 1961, No. 10964 of September 20, 1961, No. 10985 of January 15, 1962, No. 11907 of March 6, 1963 and by Section 1(a) of No. 11382 of November 28, 1967, is superseded as of the effective date of this order.

SEC. 15. *Effective date.* This order shall become effective on June 1, 1972.

/s/ RICHARD NIXON

THE WHITE HOUSE,
March 8, 1972.

APPENDIX B

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES (ESTABLISHING A PROCEDURE TO GOVERN COMPLIANCE WITH CONGRESSIONAL DEMANDS FOR INFORMATION)

MARCH 24, 1969.

The policy of this administration is to comply to the fullest extent possible with congressional requests for information. While the executive branch has the responsibility of withholding certain information the disclosure of which would be incompatible with the public interest. This ad-

ministration will invoke this authority only in the most compelling circumstances and after a rigorous inquiry into the actual need for its exercise. For those reasons executive privilege will not be used without specific Presidential approval. The following procedural steps will govern the invocation of executive privilege:

1. If the head of an executive department or agency (hereafter referred to as "department head") believes that compliance with a request for information from a congressional agency addressed to his department or agency raises a substantial question as to the need for invoking executive privilege, he should consult the Attorney General through the Office of Legal Counsel of the Department of Justice.

2. If the department head and the Attorney General agree, in accordance with the policy set forth above, that executive privilege shall not be invoked in the circumstances, the information shall be released to the inquiring congressional agency.

3. If the department head and the Attorney General agree that the circumstances justify the invocation of executive privilege, or if either of them believes that the issue should be submitted to the President, the matter shall be transmitted to the Counsel to the President, who will advise the department head of the President's decision.

4. In the event of a Presidential decision to invoke executive privilege, the department head should advise the congressional agency that the claim of executive privilege is being made with the specific approval of the President.

5. Pending a final determination of the matter, the department head should request the congressional agency to hold its demand for the information in abeyance until such determination can be made. Care shall be taken to indicate that the purpose of this request is to protect the privilege pending the determination, and that the request does not constitute a claim of privilege.

RICHARD NIXON.

APPENDIX C

Status of Documents in Issue

Irwin Affidavit Reference	Description	Publicly Available	Section (b)(1) Invoked	Section (b)(5) Invoked	Already Reviewed *in Camera* in Nuclear Responsibility
¶ A	Covering Memo	No	Yes	Yes	No
¶ B	Report of Irwin Committee	No	Yes	Yes	No
¶ B1	AEC-Seaborg Letter	Parts	Parts(?)	Parts(?)	Yes
¶ B2	Kissinger Report	No	Yes	Yes	No
¶ B3	Impact Statement	Yes	No	No	No
¶ B4	AEC-Briefing Transcript	Parts	Parts	Parts(?)	Yes
¶ B5	CEQ Memorandum	Parts	No	Parts	Yes
¶ C	Ruckelshaus Letter	No	No	Yes	Yes
¶ C	Train Letter	No	No	Yes	Yes
¶ C	David Letter	No	Yes	Yes	Yes

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APPENDIX D

EFFECTS EVALUATION
FOR
CANNIKIN EVENT

By Merritt

January 1971

United States Atomic Energy Commission
Nevada Operations Office

Handle as Restricted Data in
Foreign Dissemination Section
144B, Atomic Energy Act, 1954

[omission]

Group 1
Excluded from Automatic
Downgrading and
Declassification

[omission]

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ABSTRACT

CANNIKIN is to be [deletion] megaton detonation 5875 feet deep on Amchitka Island, Alaska in late September, 1971. Its purpose is a proof test of the Spartan warhead.

In evaluating the possible effects of the shot, the dominant considerations are containment of radioactivity, effects on the ecology and the possibility of triggering a large earthquake and generating a damaging tsunami. Containment should be assured because CANNIKIN's scaled depth of burst is well within the range shown acceptable by experience at the Nevada Test Site and previously at Amchitka. Ecological effects expected are those associated with construction and site preparation activities, cracks and tears in the tundra associated with surface subsidence, killing of stickleback in a few nearby lakes, rock and turf falls on adjacent coasts with possible disturbance of a few (<7) bird nesting sites, and overpressure damage to a few (<20) sea otters in the nearby sea. As to a tsunamigenic earthquake, three things must happen in sequence; first, a major earthquake would have to be triggered; second, that earthquake would have to generate an important tsunami; and finally, that tsunami would have to be directed at populated coastal regions. All are individually unlikely so that the risk of tsunami damage appears negligible. Nevertheless the Tsunami Warning Network will be specially alerted for CANNIKIN.

Various experimental programs are being undertaken to verify these predictions and to help predict effects for later shots, should Amchitka ever be needed again.

We conclude that the CANNIKIN event may be safety carried out as planned.

1.0 Introduction

1.1 *Description*

The CANNIKIN event is a proposed full yield [deletion] test of the Spartan [deletion] Warhead designed by the Lawrence Radiation Laboratory, to be conducted at Site C (Hole UA-1), Amchitka Island, Alaska. This island is near the center of the Aleutian Island arc (51.5°N, 179°E; see maps, Figures 1 and 2). The device is to be placed at a depth of 5875 feet in volcanic breccias underlying the Banjo Point and Kirilof Point formations. The planned ready date is September 15, 1971.

1.2 *Purpose*

The purpose of the CANNIKIN event is to provide experimental verification of the yield and outputs of the Spartan Warhead. This report summarizes the predicted physical and biological effects of the CANNIKIN detonation. It also describes studies which have been or are to be carried out to give greater credence to these predictions and to verify them after the fact. This effects prediction uses information available as of December 1, 1970.

1.3 *Responsibilities*

This report has been prepared at the request of the Office of Effects Evaluation, NVOO, from contributions by the Battelle Memorial Institute, (BMI), the Environmental Research Corporation (ERC), the U. S. Geological Survey (USGS), Teledyne Isotopes Palo Alto Laboratories (TI),

the National Oceanic and Atmospheric Administration's Air Resources Laboratory (ARL), the U. S. Public Health Service (USPHS), the Lawrence Radiation Laboratory (LRL), and the Sandia Laboratories (SL).

Dr. M. L. Merritt of Sandia Laboratories, Albuquerque, has been named Effects Evaluation Scientist for the CANNIKIN event and is responsible for compiling the results contained in this report. Mr. R. L. Ballard, is Effects Officer.

1.4 *Evaluation by NVOO Panels and Committees*

Two previous shots have been detonated at Amchitka, the Long Shot event of October 29, 1965, an ARPA/DOD-sponsored event of 80 kt at a depth of 2350 feet, and the MILROW event of October 2, 1969, an AEC-sponsored "calibration" event of [deletion] at a depth of 4000 feet. Amchitka was chosen as a Supplemental Test Site in 1967 after a review that included geological considerations, ground motion, ground water [8] contamination, ecological effects, airblast, and seismic sea waves. Similar reviews were carried out preparatory to MILROW and of MILROW results.

CANNIKIN is reviewed by three NVOO panels. The Test Evaluation Panel reviews the containment aspects of the project; the NVOO Panel of Consulants and the Ad Hoc Committee on Seismology review the overall environmental safety efforts including ground motion, water contamination, ecological effects, seismic effects and seismic sea waves, only excluding the possibility of release of radioactivity to the atmosphere. In addition,

the Nuclear Safety Study Group performs review of the assembly, transportation, emplacement, timing and firing, and arming and firing phases of the proposed device.

The Test Evaluation Panel will review CANNIKIN on January 26, 1971, and at every meeting thereafter.

The NVOO Panel of Consultants met on November 19-20, 1969, reviewing MILROW results among other things. The Ad Hoc Committee on Seismology (also called the Ad Hoc Committee on Aftershocks and Seismic Phenomena), met on December 11-12, 1969, to hear briefings on seismic and related measurements made on JORUM and MILROW. The Panel met again on June 9-10, 1970, and the combined Panel and Ad Hoc Committee on January 12-13, 1971. The letter reports resulting from the last four meetings are given in full in Appendix A.

The Panel concluded during its November 1969, meeting that they saw "no unusual problems or hazards." They discussed ground water contamination at length and reserved judgment until studies were further along, returning to the subject in January 1971.

In its December 1969 meeting the Ad Hoc Committee on Seismology said, "As a result of the MILROW event we see no reasons to have greater concern than that expressed in our reports of May 22 and June 24, 1969, but we must respect our earlier statement that a small but non-negligible chance exists that a nuclear detonation on Am-

chitka could prematurely trigger a major earthquake in the vicinity."

And later, regarding tsunamis:

"The possibility of a tsunami hazard in connection with Amchitka testing can be subdivided into two categories:

(1) direct generation caused by ground upheaval or by local fault dislocations associated with cavity expansion, and

[9]

(2) indirect generation arising from premature stimulation of a large natural earthquake...

"The MILROW event produced smaller ground unheaval than the predictions used for pre-shot water wave calculations. No waves were observed following MILROW that were above noise threshold."

"Even a yield several times as large would not be expected to significantly alter these results. Thus, we conclude that direct generation of tsunamic is not a probable hazard."

"As regards indirect generation, in addition to the recommendations herein, concerning the improvement of assessment of the triggering potential of large earthquakes, it is recognized as important to examine the potential for tsunami generation from reasonable earthquake models in the Amchitka region."

The Committee went on to recommend a number of studies along this line, but did not at that time

make a specific judgment about the probability of a tsunami being generated if an earthquake were triggered.

By the time of their June 1970, meeting, the NVOO Panel of Consultants had been expanded to include experts in the biological sciences and some of the members of the Ad Hoc Committee on Seismology. At this meeting, in addition to reviewing the basic safety itself of upcoming tests, the Panel looked in detail at the proposed programs. With regard to earthquake safety, they reached the same conclusion as before, but in quite different words:

"Although a general theory of the mechanism by which an underground explosion causes earthquakes to occur has not been developed, the experience gained in NTS, CNTS and STS supports the conclusion that an explosion will not trigger a large earthquake (defined as one releasing as much or more seismic energy than the explosion itself) unless the event is detonated near a fault on which an earthquake of this magnitude is imminent. This has not occurred to date."

With regard to tsunamis they said that they had "reviewed the evidence regarding the possibility of tsunami generation . . . and it agrees with the conclusion of a negligible damage risk." In both instances they were satisfied with the planned program.

Comments on ecological problems and programs were more detailed than had been possible before. They were: "The Panel continues to find [10] ecological surveillance at Amchitka adequate and finds

no reason to recommend any additional studies to those already planned. Because of the insignificant impact of MILROW on biomedical and ecological conditions, we would indeed feel that studies may well be limited to those of practical concern; i.e., sea otter protection, monitoring of human food chains, (monitoring of commercial fisheries.)

"With respect to future ecologic studies at Amchitka, we would urge that, wherever possible, scientists within Alaska itself be recruited to conduct these studies."

"The Panel urges that destructive effects of the construction group should not be overlooked in comparison with the attention directed to the explosive effect itself. Moreover, archeological remains should be carefully protected wherever possible."

The Panel's concluding statement on CANNIKIN was, "The reports on Event MILROW reinforce the Panel's view that extrapolation for the contemplated yield of CANNIKIN is warranted."

Most recently, the Ad Hoc Committee on Seismology and the Panel of Consultants met on January 12-13, 1971, principally to consider CANNIKIN. Their summary comments were these:

"1. *Seismology*

While reaffirming its earlier conclusion that there is a very small but finite possibility that a large underground nuclear explosion on Amchitka will trigger a major earth-

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quake that might in turn generate a damaging tsunami, the Panel is reassured by the results of the MILROW test. In addition, the numerous geological and geophysical studies that have been carried out in the Amchitka area during the past few years have tended to ease our concern over the possibility of such a triggered event, and in our best judgment, the proposed CANNIKIN event will be safe in this regard. . . .

"We also reiterate once again our firm opinion that no large earthquake will be triggared by the CANNIKIN event unless the same large earthquake were about to occur naturally even in the absence of an underground explosion. If a destructive tsunami were indeed to be produced, a major saving of lives might well be effected with the more adequate tsunami alert that presumably will accompany a scheduled nuclear event.

[11]

"2. *Tsunamis*

"a. *Direct effects*:

"Thus the maximum volumetric sea-surface displacement during (Milrow) was substantially less than 1 millionth of that accredited to large tsunamis. No significant alteration of these circumstances is implied by the CANNIKIN test, or any nominal extrapolation thereof. . .

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"b. *Indirect Effects*:

"The possibility that a CANNIKIN-triggered-earthquake might generate a destructive tsunami would require the coincidence of two apparently unrelated events (and this implies) a very low probability of the type of gross sea floor motion associated with tsunamigenic earthquakes in Alaska (1964) and Chile (1960).

"3. *Hydrology*

"The geology and hydrology of Amchitka are well defined. Based on these data, the shot site for CANNIKIN was selected. Precautions were taken to avoid systems of open interconnected fractures which could allow considerable tritiated water to reach the sea within the half-life of tritium. Creditable models predicting the containment of radioactive water demonstrate that there is no potential hazard associated with radioactive water reaching the ocean. This prediction is substantiated by age-dating of the water contained in the hydrological system.

"4. *Bio-environmental*

"Over-all AEC activities, including CANNIKIN, have not and will not interfere with or modify the function of Amchitka as a National Wildlife Refuge other than to possibly enhance it through development or

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roads and facilities and providing previously unknown ecological knowledge on the biological and physical aspects of the refuge and surrounding environs. Publication of these findings in the open literature or in the single compendium should be encouraged."

[12]

The Nuclear Safety Study Group reviewed and approved the preliminary plans for transportation, emplacement, timing, arming and firing the CANNIKIN device on December 9, 1970. They recommended another study at a later date, when the device plans would be firmly established. This date has not yet been selected.

No other reviews are expected, except of course, constant review by the Lawrence Radiation Laboratory as the weapon laboratory, by the Test Manager, and by higher echelons of approval.

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2.0 *TECHNICAL DATA*

Nominal Device Yield	[deletion]
Max. Credible Yield	[deletion]
Depth of Burst (DOB)	5875 ft (1790 m)
Scaled DOB (nominal)	[deletion]
(max. cred.)	[deletion]
Shot Media:	
Volcanic breccia and andesites, Banjo Point Formation	0-1395 ft (0-425 m)
Pillow lavas and breccias, Kirilof Point Formation	1395-5030 ft (425-1534 m)
Older breccias	5030-7000 ft (1534-2135 m)
Ground Water Table	35 m (115 ft)
Distance to nearest faults	N 3300 ft (1 km) S 2000 ft (0.6 km) (suspected)
Device Laboratory	Lawrence Radiation Laboratory, Livermore, Calif.

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